Ch. 4 - Board Problems

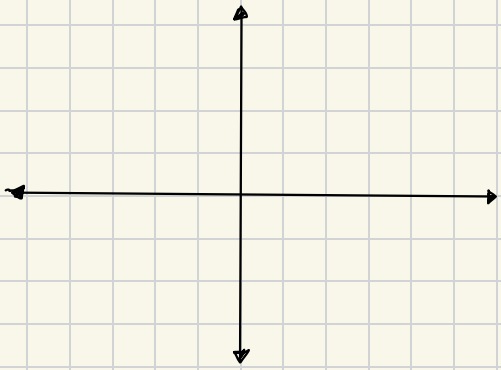
Solve the system of equations.

1) $3x^2 + 2y^2 - 54y - 143 = 0$
$x - 3y - 3 = 0$

2) $5x^2 + 20x + 9y - 7 = 0$
$5x^2 + 10y^2 + 20x - y - 67 = 0$

Graph the Hyperbola

3. $9y^2 - 4x^2 = 36$



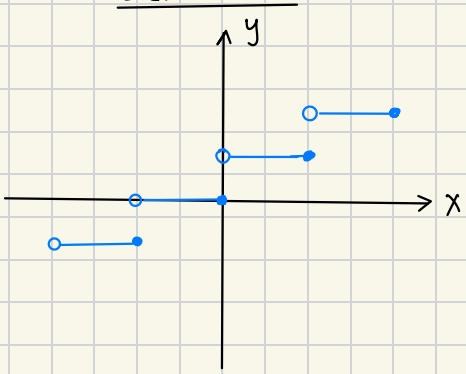
Ch. 4 - FUNCTIONS

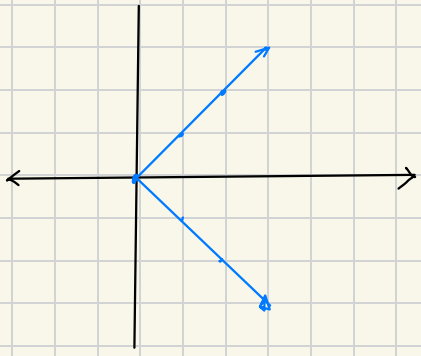
DEFINITION OF A FUNCTION: _____

_____

VERTICAL LINE TEST TO DETERMINE FUNCTIONS

STEP FUNCTION

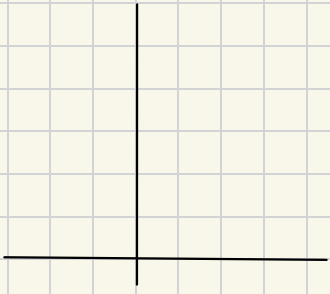




FUNCTION? _____

$y =$

EXPONENTIAL FUNCTION



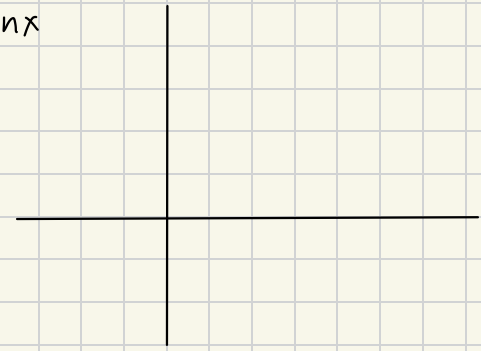
$f(x) = e^x$

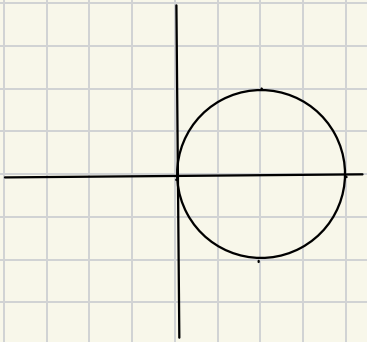
X	Y
-1	
0	
1	
2	

NATURAL LOG

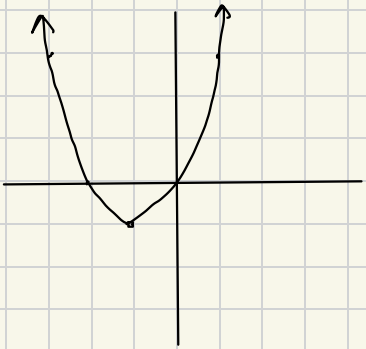
$g(x) = \ln x$

X	Y





FUNCTION ? _____



FUNCTION ? _____

EVALUATING FUNCTIONS

$y = 2x - 3$

$f(x) = 2x - 3$

$f(2) = 2(\ ) - 3$

$g(x) = x^2 - 9x + 14$

EVALUATE: $G(0) =$

$G(-1) =$

$G(3) =$

THIS mean these points are on the $g(x)$ parabola.

(,) (,) (,)

EVALUATE:

$g(b) =$

$g(b+1) =$

$g(x+h) =$

DEPENDENT AND INDEPENDENT VARIABLES

$y = 2x + 4$ $x =$ _____ VARIABLE

or $f(x) = 2x + 4$ $y =$ _____ VARIABLE

WE CAN "PICK" x because it's the _____ VARIABLE, AND "SOLVE" FOR Y because IT'S VALUE _____ on the VALUE OF X.

DOMAIN: _____

RANGE: _____

FIND THE DOMAIN AND RANGE FOR THE FOLLOWING

1. $f(x) = x - 3$ d = _____ r = _____
2. $f(x) = x^2 + 2$ d = _____ r = _____
3. $f(x) = e^x$ d = _____ r = _____
4. $f(x) = -|x + 2| + 1$ d = _____ r = _____

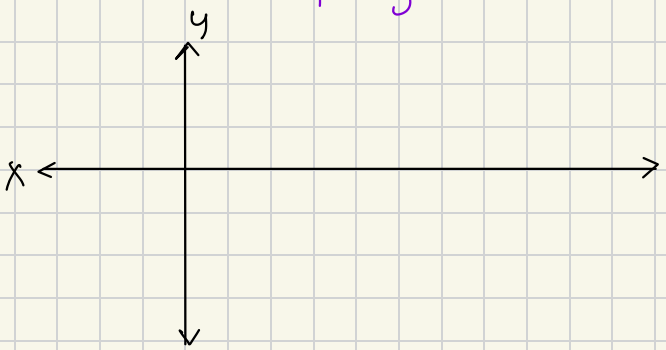
EX. 3 REWRITE IN FUNCTION NOTATION AND GRAPH.

$y = \sqrt{x}$ (parent function)

_____
function notation

EX. 4 graph $f(x) = \sin(x)$

3 1 $g(x) = 2\sin x - 1$



EX. 5 write a function that shows the area of a SQUARE depends on side length.

_____

EX. 6 write a function that shows the area of a circle depends on radius length.

_____

REVIEW OF COMPOSITE FUNCTIONS.

EX. 7 $f(x) = 2x + 3$ $g(x) = x^2 + 2$

FIND $f(g(x))$ and $g(f(x))$

EX. 8 $r(x) = 2 - x$ $s(x) = 2x + 1$

Find $r(s(x))$ and $s(r(x))$

INVERSE FUNCTIONS

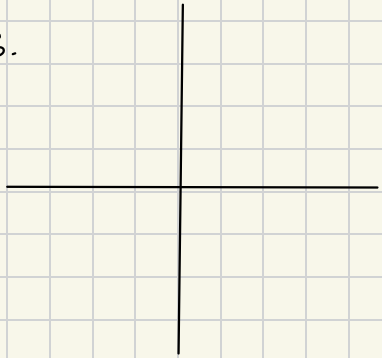
$f(x) = 3x$ so

x	y
-2	
1	
0	
2	

Therefore, $f^{-1}(x)$

x	y

Graph both functions.

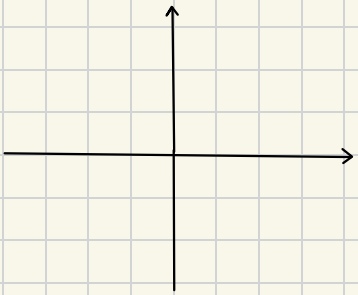


HOW TO FIND INVERSE OF A FUNCTION.

1. replace $f(x)$ with y $\quad y = 3x$
2. switch x and y $\quad x = 3y$
3. solve for y. $\quad y = \frac{1}{3}x$
4. replace y with $f^{-1}(x)$. $f^{-1}(x) = \frac{1}{3}x$

DOES EVERY FUNCTION HAVE AN INVERSE?

$f(x) = x^2$ find $f^{-1}(x)$. graph both functions.



IS THE INVERSE A FUNCTION?

EX. 9 Find the inverse to $f(x) = -x + 2$

EX. 10 FIND THE INVERSE TO $f(x) = 2(x-4)^2 - 3$

LESSON PRACTICE

Solve.

1. $f(x) = x^3 - 5x^2 - 4x + 20$ Find $f(0)$, $f(1)$, $f(3)$, $f(5)$.

2. $A(r) = \pi r^2$ Find $A(0)$, $A(2)$, $A(3)$.

3. $f(x) = 4 - 2x^2 + x^4$ Find $f(0)$, $f(1)$, $f(-1)$, $f(2)$, $f(-2)$.

4. $G(z) = z^2 (z^2 - 4)$ Find $G(0)$, $G(1)$, $G(2)$, $G(-2)$.

5. $F(y) = 2^y$ Find $F(0)$, $F\left(\frac{3}{2}\right)$, $F(-1)$, $F(y - 2)$.

6. $f(x) = x + 2$ Find $f(x + h)$, $f(x + h) - f(x)$.

LESSON PRACTICE 4A

7. Given $f(x) = \frac{1}{x}$, show that $f(x + h) - f(x) = \frac{-h}{x^2 + xh}$.

8. Given $f(y) = y^2 - 2y + 6$, show that $f(y + h) = y^2 - 2y + 6 + 2(y - 1)h + h^2$.

Express the function by a formula and draw the graph for #9-12.

9. The time required for a man to travel one mile as a function of speed.

10. The side of a square as a function of the area.

11. The side of a cube as a function of the volume.

12. The area of a square as a function of the length of a side.

13. Express the area, A, of an equilateral triangle as a function of its side, x.